

Supplementary Table 1. Literature review of ruptured PPCAs associated with MMD (1980–2023)

Year	Author	Number of cases	Age (yr)	Sex	Presentation	Hemorrhage type	Acute hydrocephalus	Location of aneurysm	Treatment	Outcome
1980	Tanaka et al. ¹¹	3	18	F	Impaired consciousness	ICH		Moyamoya vessel	Conservative → disappeared (9 months)	Good
			40	M	Impaired consciousness	IVH+SAH		Distal PCA	Aneurysmectomy (true aneurysm)	Good
			57	F	Impaired consciousness	IVH	Yes	AChA	Conservative → died (20 days)	Poor
1985	Konishi et al. ¹²	5	40	M	Headache, vomiting	IVH		Distal PCA	Aneurysmectomy (true aneurysm)	Good
			18	F	Headache, vomiting	SAH		AChA	Conservative → disappeared (4 months)	Good
			57	F	Impaired consciousness	IVH		AChA	Conservative → rebleeding (20 days) → died	Poor
			13	M	Impaired consciousness	IVH		AChA	Conservative → disappeared (11 months)	Good
			34	F	Impaired consciousness	IVH	Yes	AChA	Conservative → died (10 days)	Poor
1989	Grabel et al. ¹³	1	60	M	Impaired consciousness	ICH		Moyamoya vessel	Conservative → disappeared (21 days)	Good
1994	Hamada et al. ¹⁴	2	41	F	Impaired consciousness	IVH		PChA	Conservative → rebleeding (14 days) → aneurysmectomy (pseudoaneurysm)	Poor
			48	F	Headache, vomiting	IVH		AChA	Conservative → rebleeding (35 days) → surgical clipping	Good
1996	Kawaguchi et al. ¹⁵	3	53	F	Impaired consciousness	SAH		Moyamoya vessel	Aneurysmectomy	Good
			57	F	Impaired consciousness	SAH		Moyamoya vessel	Aneurysmectomy	Poor
			52	M	Headache	SAH	Yes	PChA	Bilateral STA-MCA with EMS	Poor
1997	Kawai et al. ¹⁶	1	19	M	Headache	IVH	Yes	AChA	Conservative → rebleeding (18 months) → bilateral EDMAS (21 months) → disappeared (2 years)	Good
2000	Miyake et al. ¹⁷	2	47	M	Impaired consciousness	IVH	Yes	PChA	Aneurysmectomy (pseudoaneurysm)	Good
			11	F	Impaired consciousness	IVH+SAH	Yes	PChA	Conservative → disappeared (2 months)	Good
2001	Lee et al. ¹⁸	1	48	M	Impaired consciousness	IVH+ICH	Yes	AChA	Aneurysmectomy (true aneurysm)	Good
2001	Kuroda et al. ¹⁹	3	60	F	Headache	IVH		Distal PCA	STA-MCA+EDMAS → disappeared (3 months)	Good
			33	F	Headache	IVH		PChA	STA-MCA+EDMAS → disappeared (1 month)	Good
			50	F	Impaired consciousness	ICH		PChA	STA-MCA+EDMAS → disappeared (3 months)	Good
2003	Wong et al. ²⁰	1	62	F	Impaired consciousness	IVH+ICH		AChA	Surgical clipping	Poor
2004	Ali et al. ¹⁰	1	26	M	Impaired consciousness	IVH+ICH	Yes	PChA	Conservative → rebleeding (14 days) → aneurysmectomy (true aneurysm)	Poor
2004	Koebbe and Horowitz ²¹	1	31	F	Headache	IVH+ICH		MMA	Coil embolization	Good
2006	Baik et al. ²²	1	45	F	Headache, dysarthria	ICH		PChA	NBCA embolization	Good
2008	Gandhi et al. ²³	3	59	M	Impaired consciousness	IVH+SAH		LSA	Aneurysmectomy	Good
			37	F	Impaired consciousness	SAH		LSA	Surgical clipping	Poor
			31	F	Impaired consciousness	SAH		LSA	Aneurysmectomy	Good

Supplementary Table 1. Continued

Year	Author	Number of cases	Age (yr)	Sex	Presentation	Hemorrhage type	Acute hydrocephalus	Location of aneurysm	Treatment	Outcome
2009	Kim et al. ⁵	8	23	M	Dysarthria	ICH		PChA	NBCA embolization	Good
			43	F	Impaired consciousness	IVH		AChA	NBCA embolization	Poor
			34	F	Impaired consciousness	IVH+ICH		PChA	NBCA embolization	Good
			26	F	Headache	IVH		PChA	NBCA embolization	Good
			46	M	Headache	IVH+ICH		PChA	NBCA embolization	Good
			50	M	Headache	SAH		Moyamoya vessel	NBCA embolization	Good
			45	F	Hemiparesis, dysarthria	ICH		PChA	NBCA embolization	Good
			41	M	Impaired consciousness	IVH+ICH		PChA	Embolization failed → conservative	Poor
2010	Choulakian et al. ²⁴	1	35	F	Impaired consciousness	IVH+SAH	Yes	AChA	NBCA embolization	Good
2010	Park et al. ²⁵	1	43	F	Impaired consciousness	ICH+SAH		MMA	Surgical clipping failed → parent artery embolization	Good
2010	Leung et al. ²⁶	1	31	M	Hemiparesis	ICH		Distal PCA	Conservative → rebleeding (? day) → embolization failed → aneurysmectomy	Good
2010	Yang et al. ²⁷	1	38	F	Headache	IVH		AChA	Coil embolization	Good
2010	Yu et al. ²⁸	3	39	F		IVH		AChA	Onyx embolization	Good
			51	M		IVH		Distal MCA	Onyx embolization	Good
			47	F		ICH		Distal MCA	Embolization failed → conservative → disappeared	Good
2011	Arai et al. ⁹	1	58	M	Headache	SAH		Distal PCA	Embolization failed → conservative → disappeared (12 months)	Good
2011	Lévêque et al. ²⁹	1	50	F	Impaired consciousness	IVH		AChA	Endoscopic aneurysmectomy (true aneurysm)	Good
2011	Xu et al. ³⁰	1	20	M	Headache, vomiting	IVH		PChA	Glubran embolization	Good
2012	Ni et al. ³¹	2	46	M	Impaired consciousness	IVH+ICH	Yes	Moyamoya vessel	STA–MCA anastomosis+EDMS → disappeared (6 months)	Good
			29	F	Headache, vomiting	IVH		AChA	STA–MCA anastomosis+EDMS → disappeared (10 months)	Good
2013	Hayashi et al. ³²	1	61	F	Impaired consciousness	IVH		AChA	Conservative → rebleeding (7 years) → surgical coagulation	Poor
2013	Chalouhi et al. ³³	1	49	M	Headache, hemiparesis	ICH		LSA	Onyx embolization	Good
2013	Okawa et al. ⁶	1	68	F	Impaired consciousness	IVH	Yes	PChA	Aneurysmectomy (pseudoaneurysm)	Good
2013	He et al. ³⁵	3	51	M	Headache	IVH	Yes	AChA	Surgical clipping	Good
			38	M	Headache, vomiting	IVH	Yes	PChA	Aneurysmectomy	Good
			42	M	Impaired consciousness	IVH		AChA	Conservative → rebleeding (4 months) → conservative	Good
2013	Yuan et al. ³⁶	1	45	F	Headache, vomiting	IVH	Yes	AChA	Embolization failed → conservative → disappeared	Good
2014	Hwang et al. ³⁷	2	53	F	Impaired consciousness	ICH		LSA	NBCA embolization	Good
			44	F	Impaired consciousness	ICH		LSA	NBCA embolization	Good
2015	Daou et al. ³⁸	1	53	F	Impaired consciousness	ICH		Distal PCA	Onyx embolization	Good

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Year	Author	Number of cases	Age (yr)	Sex	Presentation	Hemorrhage type	Acute hydrocephalus	Location of aneurysm	Treatment	Outcome
2016	Liu et al. ³⁹	6	16	F		IVH		PChA	Embolization failed → Bilateral EDAS → disappeared	Good
			15	F		IVH		PChA	Bilateral EDAS → disappeared	Good
			9	M		IVH		PChA	Bilateral EDAS → present	Good
			7	M		IVH		PChA	Bilateral EDAS → present	Good
			11	M		IVH		AChA	Onyx embolization	Good
			10	M		IVH		LSA	Bilateral EDAS → disappeared	Good
2017	Kim et al. ⁴⁰	2	22	F	Headache, vomiting	IVH+ICH		AChA	Conservative → rebleeding (7 days) → surgical clipping → died	Poor
			33	M	Headache	IVH		PChA	Coil embolization	Good
2018	Ni et al. ²	17				ICH (1), IVH (9), IVH+ICH (7)		AChA (6), PChA (6), LSA (2), distal ACA (1), distal MCA (1), distal PCA (1)	Embolization (4); revascularization (13) → disappeared (12), stable (1)	Good (17)
2018	Rhim et al. ⁴¹	19	36.7±14.1	M (6), F (13)		ICH (4), IVH (11), IVH+ICH (4)		AChA (2), PChA (12), LSA (4), Distal ACA (1)	Embolization (complete, 3; partial, 2); conservative (14) → disappeared (12), stable (2)	Good (19)
2018	Kim et al. ⁷	3	24	F		IVH		MMA	Conservative	Good
			57	F		IVH+ICH		AChA	Glue embolization	Good
			74	M		SAH		Distal ACA	Embolization failed → conservative	Good
2019	Yamada et al. ⁸	1	29	M	Headache, vomiting	IVH		AChA	Conservative → disappeared (3 weeks)	Good
2020	Tokairin et al. ⁴²	1	53	F	Impaired consciousness	IVH	Yes	AChA	Surgical trapping	Good
2020	Zhao et al. ⁴³	3	46	F		IVH+ICH	Yes	PChA	Conservative → disappeared (10 months)	Good
			56	F		SAH		Distal ACA	Coil embolization	Good
			52	M		IVH		AChA	Aneurysmectomy	Good
2020	Larson et al. ⁴⁴	2	47	F		IVH		PChA	Aneurysmectomy (true aneurysm)	Good
			48	F		IVH		AChA	Aneurysmectomy (pseudoaneurysm)	Poor
2020	Goto et al. ⁴⁵	2	55	F	Impaired consciousness	IVH	Yes	AChA	Aneurysmectomy	Good
			44	F	Impaired consciousness	IVH	Yes	PChA	NBCA embolization	Good
2022	Byeon et al. ⁴⁶	1	42	M	Headache, nausea	IVH+ICH		LSA	Onyx embolization	Good
2022	Fu et al. ⁴⁷	1	73	M	Headache, nausea, vomiting	IVH+ICH		RAH	Embolization failed → conservative → rebleeding (5 weeks) → died	Poor
2022	Okamura et al. ³⁴	1	51	M	Headache, vomiting	SAH		Basilar perforator	Conservative → disappeared (159 days)	Good
2023	Kusakabe et al. ⁴⁸	1	45	F	Impaired consciousness	IVH+ICH		Distal ACA	STA-MCA anastomosis → disappeared (6 months)	Good

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Year	Author	Number of cases	Age (yr)	Sex	Presentation	Hemorrhage type	Acute hydrocephalus	Location of aneurysm	Treatment	Outcome
2023	Lee et al. ⁴⁹	1	22	M	Impaired consciousness	ICH+SAH		AChA	EDAS → size reduction	Good
2023	Ding et al. ⁵⁰	1	38	M	Impaired consciousness	IVH	Yes	AChA	Conservative → rebleeding → aneurysmectomy	Poor
2023	Ando et al. ⁵¹	1	42	F	Dysarthria, hemiparesis	ICH		LSA	Coil embolization	Good

PPCA, peripheral cerebral aneurysm; MMD, moyamoya disease; M, male; F, female; ICH, intracerebral hemorrhage; IVH: intraventricular hemorrhage; SAH, subarachnoid hemorrhage; PCA, posterior cerebral artery; AChA, anterior choroidal artery; PChA, posterior choroidal artery; MMA, middle meningeal artery; LSA, lenticulostriate artery; MCA, middle cerebral artery; RAH, recurrent artery of Heubner; ACA, anterior cerebral artery; STA-MCA, superficial temporal artery-middle cerebral artery; EMS, encephalo-myo-synangiosis; EDMAS, encephalo-duro-myo-arterio-synangiosis; NBCA, n-butyl cyanoacrylate; EDAS, encephalo-duro-arterio-synangiosis; EDMS, encephalo-duro-myo-synangiosis.